Name :- Patel Anuragkumar Sureshbhai

Roll no:- 25BCL106

Subject :- C Programming (Arrays & Strings)

Section A: **Programs Using Arrays**

1. Accept 5 values and print it.

```c
#include <stdio.h>
int main() {
    int arr[5], i;
    printf("Enter 5 values: ");
    for (i = 0; i < 5; i++)
    scanf("%d", &arr[i]);
    printf("The values are:");
    for (i = 0; i < 5; i++)
    printf("%d", arr[i]);
    return 0;
}
```

Output :
Enter 5 values: 1 2 3 4 5
The values are : 1 2 3 4 5

2. Accept 10 values and print 4th, 7th and 9th value.

```c
#include <stdio.h>
int main()
{
    int arr[10], i;
    printf("Enter 10 values:");
    for (i = 0; i < 10; i++)
    scanf("%d", &arr[i]);
    printf("4th value : %d\n", arr[3]);
    printf("7th value : %d\n", arr[6]);
    printf("9th value : %d\n", arr[8]);
    return 0;
}
```

Output:-
Enter 10 values: 1 2 3 3 4 5 6 7 8 9
4th value : 3
7th value : 6
9th value : 8

3. Accept 5 values and sort ascending / descending.

```c
#include <stdio.h>
int main () {
int arr [5], i, j, temp; 
printf ("Enter 5 values:");
for (i=0; i<5; i++)
scanf ("%d", &arr [i]);
for (i=0; i<5; i++) {
if (arr [i] > arr [j]) {
temp = arr [i]; arr [i] = arr [j]; arr [j] = temp;
}
}
}

printf ("Ascending:");
for (i = 0; i<5; i++)
printf ("%d", arr [i]);
for (i=4; i>=0; i--)
printf ("%d", arr [i]);
return 0
}
```

Output: Enter 5 values: 2 3 4 1 5
Ascending : 1 2 3 4 5
Descending : 5 4 3 2 1

4. Print minimum notes required

```c
#include <stdio.h>
int main () {
    int amount, notes [] = { 500, 200, 100, 50, 20, 10, 5, 2};
    count, i;
    printf ("Enter amount: ");
    scanf ("%d", &amount);
    for (i = 0; i < 9; i++) {
        count = amount / notes [i];
        if (count) {
            printf ("%d * %% d\n", count, notes [i]);
            amount %= notes [i];
        }
    }
    return 0;
}
```

output :- Enter amount : 123
```
1 x 100
1 x 20
1 x 2
1 x 1
```

5. Add two 2D Arrays :-

```c
#include <stdio.h>
int main() {
    int a [2][2], b[2][2], c [2][2], i, j;
    printf ("Enter elements of first 2x2 matrix: \n");
    for (i = 0; i < 2; i++) for (j = 0; j < 2; i++)
    scanf ("%d", &a [i][j]);
    printf (" Enter elements of second 2x2 matrix: \n");
    for (i = 0; i < 2; i++) for (j = 0; j < 2; j++)
    scanf ("%d", &b [i][j]);
```

```
printf
for (i=0; i<2; i++) for (j=0; j<2; j++) c [i][j] =
    a [i][j] + b [i][j];
printf (''sum: \n");
for (i=0; i<2; i++) { for (j=0; j<2; j++) pri
    printf (''+.d'', c [i][j];
    printf (" \n"); }
return 0;
}
```

output:- Enter elements of first 2x2 matrix: 1 2 3 4
                Enter elements of second 2x2 matrix: 5 6 7 8
        Sum:
            6   8
            10   12

6. **Multiply two 2D arrays:-**

```
#include <stdio.h>
int main() {
    int a [2][2], b[2][2], c[2][2]; i,j,k;
    printf (''Enter first 2x2 matrix :\n");
    for (i=0; i<2; i++)
    for (j=0; j <2; j++)
    scanf ('' %d'', &a [i][j]);
    printf (''Enter second 2x2 matrix :\n");
    for (i=0; i<2; i++)
    for (j=0; j<2; j++)
    scanf (" %d", &b [i][j]);
    for (i=0; i<2; i++) {
    for (j=0; j<2; j++) { c [i][j] = 0;
    for (k=0, k<2; k++) c [i][j] += a[i][k] * b[k][j];}}
    printf ("product: \n");
    for (i=0; i<2; i++) { for (j=0; j<2; j++) printf ("/.d",
    c[i][j]; printf (" \n"); }
```

8. output: Enter first 2×2 matrix : 1 2 3 4
            Enter second 2×2 matrix : 5 6 7 8
    product :
        19   22
        43   50

```
        return 0;
    }

7.  Transpose of 4x4 matrix:
    #include <stdio.h>
    int main () {
        int a[4][4], t[4][4], i, j;
        printf (" Enter 4x4 matrix ;\n");
        for (i=0; i<4; i++) for (j=0; j<4) j++)
        scanf ("%d", &a[i][j]);
        for (i=0; i<4; i++) for (j=0; j<4; j++) t[j][i]= a[i][j];
        printf (" Transpose :\n");
        for (i=0; i<4; i++) { for (j=0; j<4; j++)
        printf ("%d", t[i][j]);
        printf ("\n"); }
        return 0;
    }


8.  Copy one array of 5 to another of 10 (skipping one)
    #include <stdio.h>
    int main () {
        int a[5], b[10] = {0}, i;
        printf ("Enter 5 values:");
        for (i=0; i<5; i++) scanf ("%d", &a[i]);
        for (i=0; i<5; i++) b[i*2] = a[i];
        printf ("Coppied array:");
        for (i=0; i<10; i++)
        printf ("%d", b[i]);
        return 0;
    }

    output : Enter 5 values:  1  2  3  4  5
             Copied array: 1  0  2  0  3  0  4  0  5  0
```

9. Reverse an array of 5 elements

```c
#include <stdio.h>
int main () {
    int arr [5], i;
    printf ("Enter 5 values: ");
    for (i=0; i<5; i++)
    scanf ("%d", &arr[i]);
    printf ("Reversed; ");
    for (i=4; i>=0; i--)
    printf ("%d ", arr [i]);
    return 0;
}
```

output: Enter 5 values :
        Reversed : 5 4 3 2 1

10. find frequency of numbers in array:-

```c
#include <stdio.h>
int main ()
{
    int arr [10], freq [10] = {0}, i, j, count;
    printf ("Enter 10 values:");
    for (i =0; i<10; i++) scanf ("%d", &arr [i]);
    for (i=0; i<10 ; i++) {
        count =1;
        if (freq [i]) continue;
        for (j= i+1; j<10; j++) if (arr [i] == arr [j])
        { count ++; freq [j] =1; }
        printf ("%d occurs %d times \n", arr [i], cou
    }
    return 0;
}
```

outputs Enter 10 values: 1, 1, 2, 2, 3, 3, 4, 4, 5, 5

1 occurs 2 times

2 occurs 2 times

3 occurs 2 times

4 occurs 2 times

5 occurs 2 times

11. Shift numbers by n positions:-

```c
# include <stdio.h>
int main () {
    int arr [10], res [10] = {0}, i, n, dir;
    printf (" Enter 10 numbers: ");
    for (i=0; i<10 ; i++) scanf ("%d", &arr [i]);
    printf (" Enter shift (n): "); scanf ("%d", &n);
    printf ("Direction (0 = left, 1 = right): ");
    scanf ("%d", &dir);
    if (dir == 0) { for (i=0 ; i<10 ; i++)
    if (i+n <10)  res [i] = arr [i+n ]; }
    else { for (i=9; i>= 0 ;i--) if  (i-n>=0)res[i]=
    arr[i-n]; }
    printf ("Shifted : ");
    for (i=0 ;i<10 ;i++ ) printf ("%d ", res[i]);
    return 0;
}
```

output:-

Enter 10 numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Enter Shift (n): 2

Direction (0=left, 1=right)=1

Shifted : 0 0 1 2 3 4 5 6 7 8

12. Insert number at beginning:

```
#include <stdio.h>
int main() {
    int arr[10], n, i;
    printf("Enter 9 numbers : ");
    for(i=1; i<10; i++) scanf("%d", &arr[i]);
    printf("Enter new number: "); scanf("%d", &n);
    arr[0] = 0;
    printf("Array : ");
    for(i=0; i<10; i++) printf("%d", arr[i]);
    return 0;
}
```

output: Enter 9 numbers: 1,2,3,4,4,5,6,7,8
Enter new number : 2
Array : 2 1 2 3 4 4 5 6 7 8

13. Insert number at given position:

```
#include <stdio.h>
int main() {
    int arr[10], pos, n, i;
    printf("Enter 9 numbers : ");
    for(i=0; i<9; i++) scanf("%d", &arr[i]);
    printf("Enter new number and position (0-9): ");
    scanf("%d%d", &n, &pos);
    for(i=9; i>pos; i--) arr[i] = arr[i-1];
    arr[pos] = n;
    printf("Array : ");
    for(i=0; i<10; i++)
        printf("%d", arr[i]);
    return 0;
}
```

Output:
Enter 9 numbers: 1 2 2 3 3 4 5 6 7
Enter new number and position (0-9): 8, 8
Array: 1 2 2 3 3 4 5 6 8 7

14. Insert number at last position:
```c
#include <stdio.h> int main () {
    int arr [10], n, i;
    printf ("Enter 9 numbers:");
    for (i=0; i<9; i++) scanf ("%d", &arr[i]);
    printf ("Enter new numbers:"); scanf ("%d", &n);
    arr[9]=n;
    printf ("Array:");
    for (i=0; i<10; i++) printf ("%d", arr[i]);
    return 0;
}
```

Output: Enter 9 numbers: 1 2 2 3 3 4 5 6 7
Enter new number and position (0-9): 6 & 0
Array: 1 2 2 3 3 4 5 6 8 7 0

15. Delete first element:
```c
#include <stdio.h>
int main () {
    int arr [10], i;
    printf ("Enter 10 numbers:");
    for (i=0; i<10; i++) scanf ("%d", &arr[i]);
    for (i=0; i<9; i++) arr[i] = arr[i+1];
    printf ("After deletion:");
    for (i=0; i<9; i++) printf ("%d", arr[i]);
    return 0;
}
```

output:-
   Enter 10 numbers: 1 1 2 3 4 5 6 7 8 9
   After deletion : 1 2 3 4 5 6 7 8 9

16. Delete from particular position:-

```
# include <stdio.h>
int main() {
    int arr [10], pos, i;
    printf ("Enter 10 numbers: ");
    for (i=0; i<10; i++ ) scanf ("%d", &arr [i]);
    printf (" Enter position :"); scanf ("%d", & pos);
    for (i=pos; i<9; i++) arr [i] = arr [i+1];
    printf (" After deletion : ");
    for (i=0; i<9; i++) printf ("%d", arr [i]);
    return 0;
}
```

Output:-
   Enter 10 numbers: 1 2 3 4 5 6 7 8 9 10
   Enter position : 1
   After deletion : 1 3 4 5 6 7 8 9 10

17. Delete from last position:-

```
# include <stdio.h>
int main() {
    int arr [10], i;
    printf ("Enter 10 numbers: ");
    for (i=0; i<10; i++) scanf ("%d", &arr [i]);
    printf ("After deletion: ");
    for (i=0; i<9; i++) printf ("%d", arr [i]);
    return 0;
}
```

output:-

Enter 10 numbers! 1 2 3 4 4 5 6 7 8 9

After deletion ! 1 2 3 4 4 5 6 7 8

18. Delete a value (search and remove)

```c
#include <stdio.h>
int main () {
    int arr [10], val, i,j;
    printf ("Enter 10 numbers: ");
    for (i=0; i<10; i++) scanf ("%d", &arr[i]);
    printf ("Enter value to delete: "); scanf ("%d", &val);
    for (i=0; i<10; i++) { if (arr [i] == val){ for
    for (j =i; j <9; j++) arr [j] = arr [j+1]; break;}}
    printf ("After deletion: ");
    for (i=0; i<9; i++) printf ("%d", arr [i]);
    return 0;
}
```

output:-

Enter 10 numbers! 1 2 3 4 5 6 7 8 9 10

Enter value to delete: 5

After deletion: 1 2 3 4 6 7 8 9 10

19. Search value in array:

```c
#include <stdio.h>
int main() {
    int arr [10], val, i, found = 0;
    printf (" Enter 10 numbers: ");
    for (i=0; i<10; i++) scanf ("%d", &arr [i]);
    printf ("Enter value to search: "); scanf ("%d", &val);
    for (i=0; i<10; i++) if (arr [i] == val) {
```

```
        printf (" found at r-din", i); found=1; break;}
if (! frund )
print f (" Not found in");
return 0;
}
```

output:-
```
Enter 10 numbers : 1 2 3 4 5 6 7 8 9 10
Enter value to search : 9
found at 8
```

Section :- B :- Programs using Strings

I. **Find length of string:-**

```
#include <stdio.h>
#include <string.h>
int main() {
    Char str [100];
    printf ( "Enter string : ");
    gets (str);
    printf ( "Length : %lu \n", strlen (str));
    return 0;
}
```

output:-
```
Enter string: Anurag
Length = 6
```

2. : Convert to lowercase:

```
#include <stdio.h>
#include <ctype.h>
Int main () {
    char str [100]; Int i;
    printf ("Enter string :");
    gets (str);
    for (i=0; str [i]; i++) str[i] = tolower (str[i]);
    printf ("Lower case: %s \n", str);
    return 0;
}
```

output :-

```
Enter string : ANURAG
Lowercase : anurag
```

5. Convert to uppercase:-

```
#include <stdio.h>
#include <ctype.h>
int main () {
    char str[100]; int j;
    printf ( "Enter string : ");
    gets (str);
    for (i=0; str [i]; i++) str [i] = toupper (str[i]);
    printf ("upper case: %s\n ", str);
    return 0;
}
```

Output :-

```
Enter string : anurag
Upper case : ANURAG
```

4. <u>Toggle case:-</u>

```c
#include <stdio.h>
#include <ctype.h>
int main() {
    char str[100]; int i;
    printf("Enter string: ");
    gets(str);
    for(i=0; str[i]; i++) {
        if(islower(str[i])) str[i] = toupper(str[i]);
        else if(isupper(str[i])) str[i] = tolower(str[i]);
    }
    printf("Toggle: %s\n", str);
    return 0;
}
```

output:-

Enter string :- AnuRag

Toggle :- AnuRag

5. <u>Copy string:-</u>

```c
#include <stdio.h>
#include <string.h>
int main() {
    char s1[100], s2[100];
    printf("Enter string: ");
    gets(s1);
    strcpy(s2, s1);
    printf("Copied: %s\n", s2);
    return 0;
}
```

output:-

Enter string: anurag
Copied : anurag

6. Compare strings:-
```
# include <stdio.h>
# include <string.h>
int main() {
    char s1 [100], s2 [100]; int cmp;
    printf ("Enter first string: ") ; gets (s1);
    printf ("Enter second string: "); gets (s2);
    cmp: strcmp (s1,s2);
    if (cmp == 0) printf ("Same\n");
    else if (cmp > 0) printf (" first greater\n");
    else print f ("Second greater \n");
    return 0;
}
```

output:-

Enter first string : Patel
Enter second string : Anurag
First greater

7. Reverse string:-
```
# include <stdio.h>
# include <string.h>
int main () {
    char str [100]; int i;
    printf ("Enter string: ");
    gets (str);
    for (i = strlen (str) -1; i>0 , i--)
    printf ("%c", str[i]);
    return 0; }
```

output:- Enter string: Anurag
garunA

8. palindrome check:-

```
#include <stdio.h>
#include <string.h>
int main() {
    char str[100]; int i, len, flag = 1;
    printf("Enter string: ");
    gets(str);
    len = strlen(str);
    for(i=0; i<len/2; i++) if(str[i]!=str[len-i-1])
    { flag=0; break; }
    if(flag) printf("palindrome\n"); else printf
    ("Not palindrome\n");
    return 0;
}
```

Output:-

Enter string: Anurag
Not Palindrome

9. Concatenate strings:-

```
#include <stdio.h>
#include <string.h>
int main() {
    char s1[100], s2[100];
    printf("enter first string:"); gets(s1);
    printf("enter second string:"); gets(s2);
    strcat(s1,s2);
```

```
        printf ("Concatenated: %s\n", S1);
        return 0;
    }
```

output: Enter first string: Patel
Enter second string: Anurag
Concatenated: Patel Anurag

10. Print characters vertically:
```
# include <stdio.h>
int main() {
    char str[100]; int i;
    printf("Enter string: ");
    gets(str);
    for (i=0; str[i]; i++) printf("%c\n", str[i]);
    return 0;
}
```

output: Enter string: Any
A
n
y

11. Print reversed string vertically:-
```
#include <stdio.h>
# include <string.h>
int main() {
    char str[100]; int i;
    printf("Enter string: ");
    gets(str);
    for (i=strlen(str)-1; i>=0; i--) printf("%c\n", str[i]);
    return 0;
}
```

output:-   Enter string : Any
            u
            n
            A

12. #frequency of vowels:-
# include <stdio.h>
# include <ctype.h>
int main() {
    Cheer str [100]; int i, a=0, e=0, i1=0, o=0,
                                u=0;
        printf ("Enter string :");
        gets (str);
        for (i=0, str[i]; i++) {
        Cheer c= tolower (str[i]);
        if (c=='a') a++;
        else if (c=='e') e++;
        else if (c=='i') i1++;
        else if (c=='o') o++;
        else if (c=='u') u++;
    }
    printf ('a= %d e= %d i= %d o= %d u= %d\n",
            a, e, i1, o, u);
    return 0;
}

Output:-   Enter string : Anurag
            a= 2   e= 0   i= 0   o= 0   u= 1